הטכניון מכון טכנולוגי לישראל TECHNION Israel Institute of Technology

Faculty of Mechanical Engineering הפקולטה להנדסת מכונות

MECHANICAL ENGINEERING SEMINAR

Monday, April 3, 2023 at 14:30, D. Dan and Betty Kahn Building, Auditorium 1

Mechanical Engineering design for harsh marine environment

Morel Groper, Ph.D.

Associate Professor

The Hatter Department of Marine Technologies

University of Haifa

Email: mgroper@univ.haifa.ac.il; Website: https://www.subseaengineering-univ-haifa.com/

Hosted by: Prof. Alon Wolf

The harsh and deadly environment, the narrow band-limited communication and the restricted energy sources make deep sea exploration a vastly challenging endeavor. These and other formidable difficulties make unique demands on mechanical engineering design, rarely encountered in standard design projects. The enormous hydrostatic pressure, wave-induced stresses, loading uncertainty, and corrosive environment are just few aspects the mechanical engineer faces when designing for the marine environment. The seminar will present four research projects in the marine environment I conducted in the last three years. These include the design of a Lagrangian float to serve as an oceanographic platform for research of the water column, the adaptation of an autonomous underwater vehicle (AUV) for close-range imaging survey missions, failure analysis of a marine coupling and grappling with the challenge of estimating the dynamics of a planing hull. The mechanical design dilemmas and the selected solutions of each project will be described briefly. Mechanical design aspects of pressure hulls, buoyancy engines, underwater vehicle propulsion, bolted joints, material fatigue, experimental tests and failure analysis will be included.

From 1987 to 2010, Morel Groper served in the Israel Navy as a mechanical design engineer, a navy shipyard chief marine engineer, and as the Head of the Israel Navy Naval Architecture and Marine Engineering Department. Prof. Groper earned his PhD in 1999 from the Faculty of Mechanical Engineering at the Technion – Israel Institute of Technology. In 2010, Morel retired from the Navy and launched an R&D company to provide advanced mechanical engineering design to the marine and industrial sectors. In 2014, Morel joined the University of Haifa to establish the Department of Marine Technologies and advance his own research. His SubSEA Engineering Laboratory at the Hatter Department of Marine Technologies conducts research works in design of underwater marine vehicles, water lubricated bearings and mechanical components in the marine environment. His research interests include mechanical design of systems and components, tribology in the marine environment, and propulsion of marine platforms.

Seminars Coordinator: Assoc. Prof. Matthew Suss.